Space Weather Forecast

Issued on Friday, 21 July 2023 at 01:28 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Chance of Minor/Moderate blackouts throughout. Chance of (Minor/Moderate Storms today.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low. For most of the period the solar activity has been stable at low Common class levels. There are currently seven sunspot regions on the solar disc. There has been little or no change with any of the regions during the period. AR3373 remains the largest and most complex region, and produced the largest flare of the past 24 hours, a large Common class flare. AR3372 and AR3379 persist as elongated groups, with moderate magnetic complexity, but have been stable. The remaining regions are smaller, weak and magnetically simple. A new region, at a high southern latitude, was previously visible but has recently faded. No Earth directed Coronal Mass Ejections (CME's) were observed in the available imagery.

Solar Wind / Geomagnetic Activity: Solar wind parameters showed a stable slow wind regime until the afternoon. Then the first expected CME (from 18 July) arrived with the speed jumping from 375 to 450km/s, then peaking at 487 km/s at 20/1750 UTC. The solar wind speed is currently around 400 km/s. There still remains a second CME to arrive in the forecast.
The strength of the solar wind's magnetic field was weak before the CME arrival, then reached moderate levels. The important north-south component of the magnetic field was initially weakly positive, then changed to fluctuating after the CME arrived, becoming occasionally moderately negative. The net effect of the above solar wind measures was for Quiet conditions, which temporary increased to Active levels between 20/1500-2100 UTC.

Energetic Particles / Solar Radiation: The high energy proton flux (greater than 10MeV), as observed by GOES16, fell through the 10pfu S1 threshold, having started the period at 12 pfu to end the day around 2 pfu, therefore still slightly elevated above background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity carries a chance of returning to Moderate over the following days, with a Chance of isolated M-class flares and a Slight Chance of an X-class flare. However, activity may increase as later in the period new regions are likely to rotate onto the visible disc.

Solar Wind / Geomagnetic Activity: One Earth directed CME may arrive today, but confidence is low regarding this, leading to a chance of G1/G2 intervals. There are no further CME's expected during the period. Coronal hole influence is possible from CH26 in the southern hemisphere, with a weak enhancement potentially arriving today or tomorrow, and then persisting for up to 2 days with speeds around 450-500 km/s. Later in the period declining coronal hole influence is expected, with the solar wind returning to background levels. Geomagnetic activity is expected to be Quiet to Unsettled today and tomorrow, with occasional Active intervals and a chance of G1/G2 minor to moderate geomagnetic storm intervals today.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.

Met Office Space Weather Forecast

Energetic Particles / Solar Radiation: The high energy (greater than 10MeV) proton flux is expected to continue to decline, reaching background levels. Later in the period there is a slight increase in the possibly of S1 as AR3373 rotates further across the western hemisphere.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	10	1	1
Strong	G3	No	5	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	45	45	45	45
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	10	10	10	15
Very Active	≥ S3 *	No	0	0	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2023. All Rights Reserved.